



State of Idaho

DEPARTMENT OF WATER RESOURCES

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GOVERNOR

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May 10, 2000

Doug Rosenkrance
Watermaster, Water District 34
PO Box 53
Mackay, ID 83251

Re: Upper Fish Hatchery Canal

Dear Doug:

This letter documents our visit and tour of the Upper Fish Hatchery Canal on April 26, 2000. The letter also summarizes our discussion and represents my recommendations regarding the planned study for determining canal seepage losses. This letter is submitted to you in accordance with item number 7 of the Stipulation, Settlement, and Joint Motion for Order (Stipulation) dated October 12, 1999.

Please review the comments and recommendations below and advise me of any concerns thoughts, or additional recommendations regarding the final study plan. I think it is up to you to make any final adjustments. If necessary, you may want to combine our recommendations into a single document that can be distributed to the concerned parties.

The methodology that we discussed involved the following elements or approaches:

- a) Measure the total canal diversion at the canal heading using the existing 6 ft. Cipolletti weir. This weir appeared to meet standard design and installation criteria. It is an acceptable measuring device. The weir pool staff gage appeared to have been reset and it's elevation zeroed with the weir crest. Your measurements should include sticking a weir on the weir crest for consistency with the weir pool gage (i.e.; check that weir pool gage has not been moved or altered etc.)
- b) Measure the first canal lateral diversion: Johnson/Reno Ditch. The installed weir is a 4 ft. contracted rectangular weir. The construction of the weir itself appeared to be acceptable but some maintenance is required. Specifically, sediment in the weir pool should be removed so that the crest of the weir is about 1 ft. above the bottom of the approach channel. The weir pool should also be widened several feet to improve approach conditions. Assure that the weir is set level (the weir was slightly off level, the south end of the weir could be raised, or north end lowered slightly). Stabilize ditch banks around abutments to prevent leaks (there was a small leak around the north end of the weir at the time of our visit).
- c) Measure the Unger re-diversion pumps individually. Measure the three pumps using the district's portable ultrasonic flow meter. Two of the three pumps, # 1 and # 2, can be measured easily on exposed mainline. The exposed mainline has sufficient

straight length of pipe for the ultrasonic meter. Measurement can be made at pump #1 by placing the meter sensors on the first pivot tower. There was a long run of straight aluminum mainline from pump 2 that can easily be measured. The mainline at pump 3 dives into the ground a short distance from the pump and may lack sufficient length of pipe for an accurate measurement. The owner should be asked to dig a hole and expose a section of pipe to assure a measurement can be obtained. This access should be provided during the course of the study. When measuring these three pumps, try to assure that there will be no changes in system discharge during the time you measure them. This may require coordination with the owner or ranch manager. For example, a shutdown of the pivot at pump 1 while you're measuring pump 2 or 3 and before measuring the end weir may effect your total loss calculations. Results will be best if canal inflow, outflow and reach diversions are maintained at relatively constant discharge rates. Any system changes or unusual observations should be noted in some set of field notes that accompany your measurements. It may be helpful to install a portable weir in the canal above the Unger pumps to compensate for any problems associated with measuring the pumps and for the purpose of acquiring additional reach flow data. However, this additional weir should not be necessary as long as the diversions are held constant during your round of measurements.

- d) Measure water at the end of the ditch using the installed 4-ft. rectangular contracted weir. This weir was recently installed. It appeared to meet standard design and installation criteria. This is an acceptable weir. The staff gage at this weir had also been set and zeroed with the weir crest. We did observe a small leak on the east side of the weir. The leak may seal naturally but should be monitored. The Gates ranch manager was present at the inspection and agreed to take action to repair the leak.
- e) No other diversions, inputs etc. were observed on the canal between the heading and the end weir. We inspected that part of the ditch that intercepts the Lehman Creek channel. You noted that this creek channel no longer reaches the canal since the upstream water right holder on Lehman Creek installed a storage pond.
- f) Compute total canal seepage loss as:
$$G \text{ (cfs)} = Q_{out} + (D1+D2+D3+D4) - Q_{in}$$
where,
 $G \text{ (cfs)}$ = total canal reach gain/loss in cfs between ditch heading and end weir
 Q_{out} = discharge at end of canal measured with 4 ft. rectangular weir
 Q_{in} = discharge at head of ditch near hatchery measured with 6 ft. Cipolletti weir
 $(D1+D2+D3+D4)$ = sum of Johnson/Reno ditch (D1) and Unger pumps (D2, D3, D4)

This equation can also be written as:

$$G = Q_{out} + \sum Di - Q_{in}$$

where,

$\sum Di$ = sum of canal diversions

The percent gain/loss (%G) may be determined as:

$$\%G = G/Q_{in} \times 100$$

g) Frequency of measurements:

- My initial recommendation for measurement frequency is biweekly (every other week). However, Chuck Brockway advised me that one of the problems associated with the first study was the lack of frequent measurements. Dr. Brockway and Terry Scanlin, a second consultant hired by one of the other users have suggested weekly measurements. This may not be practical if the portable ultrasonic meter is to be used to measure the three Unger pumps. The amount of time required to measure the pumps and competing demand for use of the meter around the district may be a disincentive to frequent measurements. An alternative solution therefore may incorporate the following steps and frequency of measurements:

- 1) Install a temporary weir above the Unger pumps and make at least weekly measurements on this weir along with measurements on the 6-ft. Cipolletti inflow weir and 4 ft. rectangular outflow weir. Use the same reach formula as above (less the Unger diversions).
- 2) Measure the Unger pumps individually using the district's ultrasonic meter on a biweekly basis (every other week).
- 3) Record discharge pressures on Unger pumps each time the pump is measured and each week when only the three weirs are measured. The discharge pressures will help indicate changes in flows or operating conditions associated with the pumps.

I recognize that the Stipulation requires installation of measuring devices to carry out the study. In this case, I feel that measurement of the Unger pumps using the district's portable meter will be easier and perhaps more reliable than using installed meters. This should also provide a more accurate measurement of the pump diversions rather than taking the difference between a weir above the pumps and the weir at the end of the ditch. I do not anticipate that a great amount of time will be needed to measure these pumps with your meter, particularly if Unger cooperates in providing you appropriate access to his mainline at pump 3. However, I also recognize that it will be difficult to make more frequent measurements using the portable meter only. Therefore, I feel it would be best to pursue the frequency plan outlined under item f) above.

Item number 9 of the IDWR Preliminary Order dated November 18, 1999 states:

"The Stipulation and Preliminary Order do not prevent including procedures in the plan of study needed to determine canal losses based upon conditions as they existed prior to the changes that will occur if the pending applications are approved."

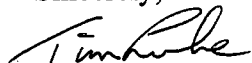
I think this condition was intended to either simulate existing conditions prior to rights being transferred or provide use of computational techniques where losses might be extrapolated from current to pre-existing conditions. I'm not sure it will be possible to simulate the prior conditions. Extrapolation or other computational techniques may be considered in analysis of the data and could help the department make a final recommendation for the transfers.

Your efforts at this time should be limited to conducting the study with the maximum amount of water that can be called for in the canal. After the study is completed, the department will need to make a recommendation or decision concerning the loss that will be applied to the transferred rights. I think it is probably premature for either of us to worry about the potential outcomes at this time and instead focus on gathering data.

I have not had time to study all of the approved transfers to confirm the total amount of water that should remain in the canal for those transferred rights. I will do this review and send you a list of the rights and remaining amounts under a separate cover letter or e-mail message.

Please contact me if you have questions concerning this matter.

Sincerely,



Tim Luke
Water Allocations

Cc: Dr. Charles Brockway
Terry Scanlin
Mark Gates

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SCANNED

MAR 15 2005